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eBOOK

Four Keys to Optimizing Digital Twins for Operations and Maintenance



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Contents

Digital twins: The clear way forward	3
1 Help the right people review the right content at the right time	5
2 Discover significant issues before they cost you	6
3 Create and maintain a complete, valid and secure digital twin	8
4 Speed up planning and task execution through ECM integration	10
About OpenText	13

Digital twins: The clear way forward

Today's energy and engineering assets are increasingly complex – and it's not simply a question of size and scope. Design, planning, engineering and operations experts are often spread across the globe as cloud-based tools have enabled remote collaboration.

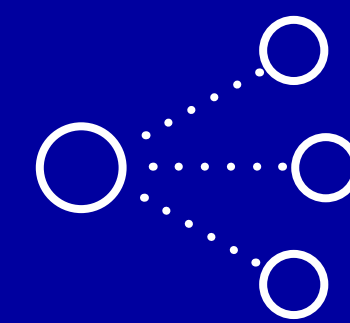
Old approaches won't suffice. That's true during planning, construction and ongoing maintenance. Today, understanding how major capital projects adapt to constant change requires a detailed, interactive, and up-to-date visual representation of the complete physical asset.

These visual representations exist today in the form of digital twins: data-powered visualizations of physical assets used to simulate multiple scenarios during design and construction, and throughout the resulting asset's lifetime.



The rise of the twin

Across a range of industries and applications, digital twins are increasingly recognized as key to improving performance, speeding up processes, predicting and pre-empting maintenance issues, ensuring quality control, cutting costs and more. According to Gartner, digital twins can save consumers and businesses **\$1 trillion a year** in asset maintenance. Half of major enterprises expect to be **using digital twins by 2023** and a third of mid-to-large-size companies will have implemented at least one digital twin associated with a **COVID-19-motivated use case**.



In this guide, learn about four ways optimizing a digital twin can increase team efficiency and production uptime for operations and maintenance.

1 Help the right people review the right content at the right time

Digital twins are more than a one-time snapshot of an asset. They are living 3D models, constantly updated with vast amounts of data from multiple people and sources, such as modelers, engineers, suppliers, IoT sensors, lidar, electrical and mechanical controllers, and fire and safety systems. Ensuring handover from engineering, procurement, and construction providers (EPCs) to owner-operators requires that this critical data is validated as it's received. Automated validation and advanced collaboration tools are key to having usable, compliant content and data.

According to a [McKinsey](#) study, large projects, across asset classes, typically take 20% longer to finish than scheduled and are up to 80% over budget. Handover from EPCs to operators are one of the significant sources of project delays.

Advanced solutions on the market today facilitate validation of handover data, checking for errors or identifying missing information before subject matter experts begin their reviews. This approach can save significant time and eliminate the need for tedious and repetitive manual checking.

Similarly, when issues do require attention, solutions that automatically assign them to the right role as soon as the data is available can increase handover process speed while maintaining project quality standards. Enabling multiple reviewers to access and update their part of a large project can save time and effort, too.



2 Discover significant issues before they cost you

Imagine an offshore windfarm just weeks away from completion. Everything is set to go, until a project manager makes the gut-wrenching observation that there is simply not enough room (by a matter of inches) for maintenance ships to maneuver around all parts of the farm's assets. The project is delayed; millions of dollars are lost; and jobs are on the line.

The risk of such a failure is high in a typical project where everything is handed over to operators at the end. At that point, operator confidence is low – because the new digital assets they receive are inevitably complex and difficult to understand without specialist tools and expertise.

Advanced approaches look to prevent these issues through a concept known as progressive assurance. It's the process of gradually building confidence in the viability and accuracy of the digital assets being delivered.

Progressive assurance leverages a digital twin to simplify processes, highlighting the data that matters and engaging the ultimate recipients (operators) early on. As construction of an asset proceeds, data for the digital twin can be imported, validated, developed and shared with relevant reviewers, to orient and train operators before the asset is even built.



35%

According to a **recent report from EY**, using accurate digital twins can deliver a 35% increase in maintenance and operation efficiency.

Digital twins in action: The National Underground Asset Register (NUAR) Pilot Programme

One-and-a-half million kilometers of underground services in the UK keep the country supplied with water, gas and electricity.

With so many assets involved, working underground is complex, inefficient, and dangerous. Accidental strikes on underground pipes and cables cost the public £1.2 billion a year, and put workers and others at risk of injury or death.

To help address these issues, the UK's Geospatial Commission launched the NUAR Pilot Programme. The goal is simple: make it easier to find out exactly what's beneath the ground to enable safer and more efficient working environments.

The Commission is working with dozens of stakeholders to create a digital twin – a single data-sharing platform to locate buried assets. The twin takes inputs from its physical counterpart via periodic uploads and APIs.

£245m

So far, 42 asset owners have participated, including local authorities, utilities, infrastructure providers and transport agencies. In addition to increased confidence in worker and public safety, the group estimates the financial value of the solution at £245m per year.



[Read more](#) about NUAR

3 Create and maintain a complete, valid and secure digital twin

Considering the decentralized nature of many major projects in today's SaaS-enabled world, ensuring approved external parties have access to the data they need in one place is crucial to maintaining data integrity. Because a digital twin is only as good as the information it's built on.

Poor data quality, uncontrolled data storage systems, and lack of proper validation can create scenarios where the twin is out of sync with the asset – or worse, completely unusable.

Beyond diminishing the value of the digital twin, safety issues can emerge when a digital version is out of step with its physical counterpart. Maintenance teams can find themselves in unsafe situations while performing their tasks. And preventive maintenance opportunities may be missed due to poor data quality in the digital twin.

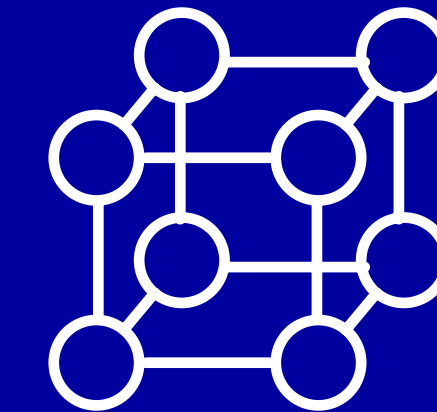
Validating and maintaining the digital twin eliminates potential degradation, and ensures it's ready for handover

to the project's owner-operator and continues to remain useful to operations and maintenance.

Industry and open standards such as ISO19650, ISO12006-2, and [BuildingSmart IFC](#), and emerging standards like [OpenCDE](#), provide clear guidance on how to validate data for digital twins.

As these guidelines indicate, usability is a key factor. Creating and maintaining digital twins can involve terabytes of data, which are often embedded inside large files stored in disparate systems. Users will take the path of least resistance when it comes to accessing the information they need (for example, opening files using unapproved apps), and when they spot contradictions, their trust in the model's data erodes rapidly.

A true model management solution doesn't just store files; it understands both graphical and semantic data, so there are no user-created discrepancies. Look for a solution that leverages cloud computing and storage to offer cost savings and ensure asset data remains safe, secure, and available throughout its lifecycle.



What BIM brings to a digital twin

Building Information Modeling (BIM) is the process of creating and managing information for a built asset. BIM integrates data from a range of sources to produce a digital representation of an asset across its lifecycle, from planning and design to construction and operations. BIM goes beyond 3D representations to capture the relationships, metadata, and behaviors that are core to physical building components.

Digital twins in action: How BIM could make the world's smartest building even smarter

Amsterdam's "The Edge" is known as the world's smartest building. Nearly 30,000 sensors feed user-generated content into a "data lake" that helps operators manage their cutting-edge asset. For example, harvesting data on how staff and visitors use the space allows operations and maintenance managers to predict which areas will require the most upkeep and resources.

The Edge is a prime example of what a well-maintained digital twin can deliver; however, it illustrates the clear need for a Building Information Modelling (BIM) solution.

"Despite having the technology to realise its potential, the quantity of data generated is huge and its collation not fully engaged with," point out analysts at the Centre for Digital Built Britain.

That's because a truly successful IoT rollout calls for "digital synchronisation of sub-components of building maintenance, energy use, facilities and user data. Ultimately an integrated system will take buildings from responsive to predictive."

But making that happen requires a shared data environment (i.e., through BIM) that can establish more "democratic links between architects, consultants, vendors and building contractors to share project-related information and risk."



[Read more](#) about
The Edge building

4 Speed up planning and task execution through ECM integration

Digital twins can reap multiple benefits from deep integrations with leading enterprise content management (ECM) solutions; especially if these ECM solutions also provide connectivity into engineering, project, HR, finance and asset management systems.

These powerful integrations enable the implementation of seamless ECM-based governance and controls while providing enterprise-wide access to the digital twin from within these leading applications.

Many solutions on the market offer file storage with links to documents, but this is only scratching the surface. Just as it's critical to carefully manage the models and their associated semantic data, it's equally important that the information contained in the digital twin does not conflict with the same data stored in any asset management system.

The surest way to prevent these kinds of conflicts is by choosing a solution that enables true integration with ECM systems. With near real-time updates between asset management systems and the digital twin, owner-operators are instantly able to query new information to validate changes to the structure, which increases overall assurance for their operations and maintenance teams. Providing access to this trusted content within the asset management solution speeds maintenance planning and execution tasks resulting in increased production uptime and revenue.

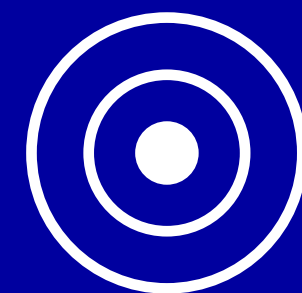


Choosing the right technology

Digital twins enable owner-operators to quickly identify preventable maintenance issues before they develop into costly ones.

For example, digital twins are used to test for structural issues before a tenant invests in a new build-out or brings heavy equipment into an existing space. Suppose a project operator wants to install a more efficient cooling system to lower their carbon footprint. The digital twin can be used to review the size of the proposed new cooler, its orientation, fit, and maintainability. The physical aspects of the building can also be taken into account, with the twin being used for heat loss calculations to ensure the new cooler is the optimal size. In this way, a complete digital twin can test for potential issues and identify areas of concern before the project begins.

Digital twins can potentially save lives too. With a complete 3D digital twin, fire and rescue teams can be informed about structural concerns, airflow restrictions, and caustic materials throughout a building.



Choose the right supporting technology to realize critical safety, cost-savings and efficiency benefits.

Digital Twin Optimization with OpenText™ Core for Building Information Modelling

OpenText™ Core for Building Information Modelling (BIM) is a SaaS offering that delivers the validation, collaboration, and adaptive tools you need to create and maintain digital twins for your capital projects and resulting assets. OpenText Core for BIM is a true collaboration and validation platform that follows the BIM standard ISO19650 tenets.

Its simple, easy-to-follow interface allows for rapid onboarding and adoption across the entire project team, including suppliers, contractors and external parties. A project owner can easily subscribe to the application and let a contractor populate the system on their behalf, and final deliverables are assigned to content authors and authorized recipients only.

This ensures a high-quality digital twin to facilitate predictive operations for streamlined logistics, prescriptive maintenance to reduce downtime and connected IOT to monitor assets.

Core for BIM can be used on its own for small projects, and also complements OpenText ECM solutions for engineering and operations to support larger initiatives. Leveraging integration with ECM makes the solution ideal as a long-term asset repository, perfectly suited to operations and maintenance requirements over time.



About OpenText

OpenText has:

- **75K+** enterprise and 470k+ SMB customers
- **100M+** end users
- **100+** offices worldwide
- **6000+** trained and certified information management professionals
- **Trillions** in network commerce
- **Three** exabytes of information under management

Resources

- ↓ Product overview: OpenText Core for Building Information Modelling product overview
- ↓ Executive brief: Ensure high quality handover from Building Information Modelling (BIM) projects
- 💬 Webinar: OpenText Connect Building Information Modeling (BIM) overview and strategy
- 📺 Video: BIM Talk Episode Playlist



About OpenText

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